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## REMARKS

Claims 1-55 are pending in the present Application. Claim 7 has been canceled, claims 1, 3, 4, 28, 39, 41, 42-46, 47 have been amended, and no claims have been added, leaving Claims 1-6 and 8-55 for consideration upon entry of the present Amendment. The Specification has been amended to correct certain typographical errors, as explained in detail below. No new matter has been introduced by these amendments. Reconsideration and allowance of the claims are respectfully requested in view of the above amendments and the following remarks.

### Amendments to the Specification

Paragraph [0108] of the specification has been amended to correct for certain typographical errors. The term "e" was corrected to "e".

### Claim Objections

Claims 42-46 stand objected to as allegedly containing informalities. Claims 42-46 have been amended to be consistent with product by process type claims as suggested by the Examiner.

### Claim Rejections Under 35 U.S.C. § 102(b)

Claims 1, 2, 4-17, 24, 26, 41, and 43-53 stand rejected under 35 U.S.C. § 102(b), as allegedly anticipated by U.S. Pat. No. 6,258,182 to Schetky et al. (Office Action dated June 15, 2005 page 2). Applicants respectfully traverse this rejection.

The Examiner states that Schetky et al. teach a beta phase titanium alloy with a  $Mo_{eq}$  which falls within the instant claimed  $Mo_{eq}$  range. (Office Action dated June 15, 2005 page 2). The Examiner further states that because Schetky et al. teach a substantially overlapping alloy composition, processed in a substantially similar method, then substantially the same properties, such as elastic recovery are inherently present. (Office Action dated June 15, 2005 page 3).

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To anticipate a claim, a reference must disclose each and every element of the claim. *Lewmar Marine v. Barient Inc.*, 3 U.S.P.Q.2d 1766 (Fed. Cir. 1987).

As currently amended, instant independent claims each claim a titanium alloy composition, wherein the composition is cold worked, and wherein the composition, after cold working, has a reduction in the elastic modulus of greater than or equal to about 10% when compared with the elastic modulus of an equivalent heat treated composition.

Schetky et al. disclose a substantially nickel-free beta phase titanium alloy comprising between 10.0–12.0 wt% Mo, 2.8–4.0 wt% Al, 0.0–2.0 wt% Cr and V, 0.0–4.0 wt % Nb, with the balance being titanium, which is capable of being cold worked to 20% “without significantly reducing” its pseudo-elastic performance. (Abstract; Col. 3 ll. 13–14) (emphasis added). In Figure 6, for example, Schetky et al. disclose that cold working their composition results in no change or a reduction in the pseudo-elastic performance. Schetky et al. further teach that “pseudo-elastic strain recovery decreases only slightly as a result of increasing amount of cold work.” (Col. 8, ll. 46–49) (emphasis added). Leaving aside whether the reduction in the pseudo-elastic performance, as disclosed in Figure 6, is a slight but not a significant reduction, Schetky et al. completely fail to teach or suggest cold working a composition to improve its pseudo-elastic performance.

Because Schetky et al. fail to teach or suggest cold working a composition to improve its pseudo-elastic performance, Schetky et al. cannot anticipate independent claims 1, 28, 39, 41, and 47 or their dependent claims as presently amended. Applicants respectfully request a withdrawal of the anticipation rejection and allowance of the claims.

#### Claim Rejections Under 35 U.S.C. § 103(a)

Claims 1–15, 22–24, 26–28, 32–35, and 37–52 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Schetky et al. (Office Action dated June 15, 2005 page 5). Applicants respectfully traverse this rejection.

Examiner states that Schetky et al. disclose examples within the instant composition range and cites specifically Table III (for example, alloys 27, 28, and 36). (Office Action dated June 15, 2005 page 5). Examiner therefore alleges that it would have been obvious to

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select any portion of the range, including the claimed range, from the disclosed broader range because the prior art finds that said composition in the entire disclosed range has a suitable utility.

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness, i.e., that all elements of the invention are disclosed in the prior art; that the prior art relied upon, coupled with knowledge generally available in the art at the time of the invention, contain some suggestion or incentive that would have motivated the skilled artisan to modify a reference or combined references; and that the proposed modification of the prior art had a reasonable expectation of success, determined from the vantage point of the skilled artisan at the time the invention was made. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988); *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970); *Amgen v. Chugai Pharmaceuticals Co.*, 927 U.S.P.Q.2d, 1016, 1023 (Fed. Cir. 1996).

An Applicant can rebut a presumption of obviousness based on a claimed invention that falls within a prior art range by showing "(1) [t]hat the prior art taught away from the claimed invention...or (2) that there are new and unexpected results relative to the prior art." *Iron Grip Barbell Co., Inc. v. USA Sports, Inc.*, 392 F.3d 1317, 1322, 73 U.S.P.Q.2d 1225, 1228 (Fed. Cir. 2004).

Applicants respectfully submit that Schetky et al. teach away from the claimed compositions and that there are new and unexpected results relative to Schetky et al. Table III and the disclosed alloys cited by the Examiner, in fact, teach away from compositions having a molybdenum content of less than 10 wt%. Table III discloses alloys #27 and #36 comprising 9.5 wt% and 8.4 wt% Mo, respectively, but these alloys failed to display either pseudo-elastic strain recovery or shape memory strain recovery. (Col. 7, ll. 50-52). Although alloy # 28, comprising 10.0 wt% Mo, did display pseudo-elastic strain recovery, its pseudo-elastic strain recovery properties were reduced compared to alloy # 42, comprising 10.2 wt% Mo, which exhibited the highest pseudo-elastic strain recovery of the fifteen alloys screened. (Col. 7, ll. 13-15). A person of ordinary skill in the art would interpret the results of this

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disclosure to suggest that a titanium alloy within the disclosed composition range having less than 10.0 wt% Mo would fail to exhibit significant pseudo-elastic strain recovery.

Further, Schetky et al. teach away from the present product by process claims in at least three disclosed processing steps. As described above, Schetky et al. disclose "pseudo-elastic strain recovery decreases only slightly as a result of increasing amount of cold work." (Col. 8, ll. 46-51; Fig. 6). In addition, Schetky et al. disclose that solution heat treating specimens at "temperatures lower than 880°C resulted in lower amounts of pseudo-elastic strain recovery." (Col. 8, ll. 36-41; Fig. 5). Finally, Schetky et al. disclose that the pseudo-elastic strain recovery of a specimen decreases after aging at 200, 300, and 400°C as compared with the pseudo-elastic strain recovery of a specimen that was not heat aged. (Col. 8, ll. 55-67).

In direct contrast to the teachings of Schetky et al., Applicants discovered that pseudo-elastic strain recovery unexpectedly increases, rather than decreases, when the presently claimed compositions, including compositions comprising less than about 10 wt% Mo, are treated by a combination comprising at least one of these three disclosed process steps. As presently amended, independent claims 1, 28, 39, 41, and 47 require cold working the composition to provide a reduction in the elastic modulus of greater than or equal to about 10% when compared with the elastic modulus of an equivalent heat treated composition. The pseudo-elastic strain recovery of the presently claimed compositions can be improved by solution heat treating at temperatures less than 880°C, such as 870°C and 871°. (Examples Table 1 and Table 2). For example, a fully recrystallized  $\beta$  grain structure was obtained after heat-treatment at 871°C for 30 minutes (Figure 19). Finally, the pseudo-elastic strain recovery of the presently claimed compositions can further be improved by subsequent heat aging for about ten seconds to about thirty minutes at a temperature of about 250°C to about 900°C. (Figures 7-12).

Because Schetky et al. teach away from several limitations of the claimed compositions, there is no motivation for one of ordinary skill in the art to modify Schetky. Applicants respectfully request a withdrawal of the obviousness rejection and allowance of the claims.

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Claims 18-23, 31-33, and 55 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Schetky et al. in view of U.S. Pat. No. 5,658,207 to Aizawa et al. (Office Action dated June 15, 2005 page 6).

Claims 27 and 38 stand rejected under 35 U.S.C. § 103(a), as allegedly unpatentable over Schetky et al. in view of U.S. Pat. No. 6,238,491 to Davidson et al. (Office Action dated June 15, 2005 page 6). Applicants respectfully traverse these rejections.

Aizawa et al. disclose a metal golf club head comprising a recess portion with a closed bottom formed in a bottom surface of a hollow metal shell and a sole plate. (Abstract). Aizawa et al. disclose that the golf club head has a hollow shell cast of metal, such as stainless steel, a titanium alloy, and an aluminum alloy. (Col. 1, ll. 7-10).

Davidson et al. disclose a device or implant at least partially fabricated from a metal alloy comprising between about 29 and 70 wt% Nb; between about 10 and 46 wt% Zr; between about 3 and 15 wt% Mo; and a balance of titanium. (Abstract). Davidson et al. disclose a device or implant that can further comprise a polymeric coating. (Col. 13, ll. 40-46).

For an obviousness rejection to be proper, the Examiner must meet the burden of establishing a *prima facie* case of obviousness. *In re Fine*, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988). Establishing a *prima facie* case of obviousness requires that all elements of the invention be disclosed in the prior art. *In Re Wilson*, 165 U.S.P.Q. 494, 496 (C.C.P.A. 1970).

As described above, Schetky et al. fails to teach or suggest a combination of compositions with requisite process limitations that improve the elastic performance of the instant claimed compositions. The compositions disclosed by Schetky either undergo a reduction in pseudo-elasticity or do not improve at all. Neither Aizawa et al. nor Davidson et al. remedy these deficiencies. Because the combined teachings of Schetky et al. and either Aizawa et al. or Davidson et al. fail to teach or suggest all elements of the claimed compositions, the cited references cannot render the claimed compositions obvious. Applicants respectfully request a withdrawal of the obviousness rejection and allowance of the claims.

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Double Patenting Rejections

Claims 28-40 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 26-38 of copending Application No. 10/755085. (Office Action dated June 15, 2005 page 7).

Claims 1-55 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 1-39 of copending Application No. 10/609003. (Office Action dated June 15, 2005 page 8).

Claims 1-55 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 1-49 of copending Application No. 10/755034. (Office Action dated June 15, 2005 page 8).

Claims 1-55 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 15-24 of copending Application No. 10/869359. (Office Action dated June 15, 2005 pp. 9).

Claims 1-55 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 1-25, 39-53 of copending Application No. 10/609004. (Office Action dated June 15, 2005 page 9).

Applicants respectfully request that the examiner withdraw the "provisional" obviousness-type double patenting rejections until the claims are in final form and condition for allowance; until such time, there is no double patenting and no way to determine double patenting. MPEP § 804.01.I(B)(1).

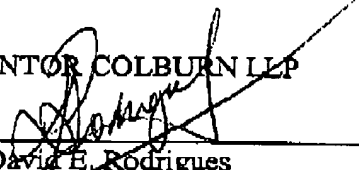
It is believed that the foregoing amendments and remarks fully comply with the Office Action and that the claims herein should now be allowable to Applicants. Accordingly, reconsideration and allowance are requested.

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If there are any additional charges with respect to this Amendment or otherwise, please charge them to Deposit Account No. 06-1130

Respectfully submitted,

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